UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,202	10/20/2003	Kohji Murayama	JP920010391US1	4460

32074 7590 01/31/2006

INTERNATIONAL BUSINESS MACHINES CORPORATION
DEPT. 18G
BLDG. 300-482
2070 ROUTE 52
HOPEWELL JUNCTION, NY 12533

EXAMINER	
CANNING, ANTHONY J	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 01/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

HA

Office Action Summary	Application No.	Applicant(s)	
	10/689,202	MURAYAMA ET AL.	
	Examiner	Art Unit	
	Anthony J. Canning	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement of Amendment

1. The amendment to the instant application was received and entered on 13 December 2005. The examiner acknowledges amendments to claims 1, 6, 10 and 14.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-6 and 8-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Aziz et al. (U.S. 2002/0135296 A1).

4. Regarding claim 1, Aziz et al. disclose an organic electroluminescent device (paragraph 0010, lines 1-3), including: a substrate (see Fig. 3, item 31; paragraph 0066, lines 7-8); electrodes including a first electrode (see Fig. 3, items 31 and 38; paragraph 0066, lines 8-9) formed on the substrate (see Fig. 3, items 31 and 38), and a second electrode (see Fig. 3, items 32 and 38; paragraph 0066, line 20) disposed to be spaced from the first electrode (see Fig. 3, all items between 32 and 38); a function layer formed between the electrodes, the function layer including a carrier injection layer, a carrier transport layer and a luminous layer (see Fig. 3, item 35;

paragraph 0066, lines 11-14); and a buffer layer (see Fig. 3, item 34; paragraph 0064; paragraph 0066, lines 15-16) included in the second electrode (see Fig. 3, items 32 and 34) and disposed to be spaced from the function layer (see Fig. 3, items 33, 34 and 35), the buffer layer having a density lower than the density of the luminous layer and the second electrode (page 4, right hand column specifies the buffer layer can be a metal oxide, aluminum oxide is a buffer material commonly used in organic electroluminescent devices, and the luminous layer is hydroxyquinoline aluminum, which is the luminous layer proposed in the specification of the instant application; the second electrode is indium tin oxide [paragraph 0011] which is also given as the electrode material in the specification of the instant application). Therefore, because the materials of the buffer layer, luminous layer and second electrode of the instant application are the same as those in Aziz et al. the examiner interprets this to mean that the buffer layer's density is lower than that of the luminous layer and the second electrode.

5. Regarding claim 2, Aziz et al. disclose the organic electroluminescent device according to claim 1, wherein the buffer layer is formed in a distance of 20 nm or less from an upper end surface of the function layer (paragraph 0042, lines 65-67). The region (see Fig. 3, item 33, not including item 34) between the buffer layer (see Fig. 3, item 34) and the function layer (see Fig. 3, item 35) can be any thickness between 5 and 500 nm, the lower end of that range falls within the limitation of 20 nm or less.

6. Regarding claim 3, Aziz et al. disclose the organic electroluminescent device according to claim 1, wherein the buffer layer contains an oxide (paragraph 0042, lines 122-123).

7. Regarding claim 4, Aziz et al. disclose the organic electroluminescent device according to claim 1, wherein the buffer layer contains aluminum oxide (paragraph 0042, lines 122-123).

Aziz et al. teach that the buffer layer can be made from a metal oxide, which encompasses all metal oxides, including aluminum oxide.

8. Regarding claim 5, Aziz et al. disclose the organic electroluminescent device according to claim 1, further including: a layer (see Fig. 4, item 47; paragraph 0067, line 8) disposed adjacently to the function layer (see Fig. 4, item 45; paragraph 0067, lines 17-21) and containing any of an alkaline metal element and an alkaline earth metal element (paragraph 0042, lines 132-134). The examiner interprets adjacently to mean near but not necessarily touching.

9. Regarding claim 6, Aziz et al. disclose a method for manufacturing an organic electroluminescent device (paragraph 0010, lines 8-10; paragraph 0066, lines 1-3) the method including the steps of: forming a first electrode on a substrate (see Fig. 3, item 31; paragraph 0066, lines 7-8); forming, on the first electrode, the function layer including a carrier injection layer, a carrier transport layer and a luminous layer (see Fig. 3, item 35; paragraph 0064; paragraph 0066, lines 11-14); forming a second electrode above the luminous layer (see Fig. 3, items 32 and 38; paragraph 0066, line 20); and forming a buffer layer (see Fig. 3, item 34; paragraph 0066, lines 15-16) in a distance of a predetermined value (paragraph 0042, lines 65-67), the buffer layer having a density lower than the density of the luminous layer and the second electrode (page 4, right hand column specifies the buffer layer can be a metal oxide, aluminum oxide is a buffer material commonly used in organic electroluminescent devices, and the luminous layer is hydroxyquinoline aluminum, which is the luminous layer proposed in the specification of the instant application; the second electrode is indium tin oxide [paragraph 0011] which is also given as the electrode material in the specification of the instant application). Therefore, because the materials of the buffer layer, luminous layer and second electrode of the

instant application are the same as those in Aziz et al. the examiner interprets this to mean that the buffer layer's density is lower than that of the luminous layer and the second electrode.

10. Regarding claim 8, Aziz et al. disclose the method for manufacturing an organic electroluminescent device according to claim 6, wherein the buffer layer contains aluminum oxide (paragraph 0042, lines 122-123). Aziz et al. teach that the buffer layer can be made from a metal oxide, which encompasses all metal oxides, including aluminum oxide.

11. Regarding claim 9, Aziz et al. disclose the method for manufacturing an organic electroluminescent device according to claim 6, further including the step of: depositing a layer (see Fig. 4, item 47; paragraph 0067, line 8) containing any of an alkaline metal element and an alkaline earth metal element adjacent to the function layer (paragraph 0042, lines 132-134). The examiner interprets adjacently to mean near but not necessarily touching.

12. Regarding claim 10, Aziz et al. disclose an organic electroluminescent display apparatus including a plurality of organic electroluminescent devices (paragraph 0010, lines 8-10; paragraph 0066, lines 1-3) formed on a substrate (see Fig. 3, item 31; paragraph 0066, lines 7-8), wherein the organic electroluminescent device includes: electrodes including a first electrode adjacent to the substrate (see Fig. 3, items 31 and 38; paragraph 0066, lines 8-9) and a second electrode disposed to be spaced from the first electrode (see Fig. 3, items 32 and 38; paragraph 0066, line 20); a function layer (see Fig. 3, item 35; paragraph 0066, lines 11-14) formed between the electrodes (see Fig. 3, items 32, 35, and 38), the function layer including a carrier injection layer, a carrier transport layer and a luminous layer (see Fig. 3, item 35; paragraph 0066, lines 13-14; specifically the electron injection layer, the hole carrier transport layer and the luminous layer); and a buffer layer (see Fig. 3, item 34; paragraph 0064; paragraph 0066, lines

15-16) included in the second electrode and disposed to be spaced from the function layer (see Fig. 3, items 33, 34, and 35), the buffer layer having a density lower than the density of the luminous layer and the second electrode (page 4, right hand column specifies the buffer layer can be a metal oxide, aluminum oxide is a buffer material commonly used in organic electroluminescent devices, and the luminous layer is hydroxyquinoline aluminum, which is the luminous layer proposed in the specification of the instant application; the second electrode is indium tin oxide [paragraph 0011] which is also given as the electrode material in the specification of the instant application). Therefore, because the materials of the buffer layer, luminous layer and second electrode of the instant application are the same as those in Aziz et al. the examiner interprets this to mean that the buffer layer's density is lower than that of the luminous layer and the second electrode.

13. Regarding claim 11, Aziz et al. disclose the organic electroluminescent display apparatus according to claim 10, wherein the buffer layer is formed in a distance of 20 nm or less from an upper end surface of the function layer (paragraph 0042, lines 65-67). The region (see Fig. 1, item 13, not including item 14) between the buffer layer (see Fig. 1, item 14) and the function layer (see Fig. 1, item 15) can be any thickness between 5 and 500 nm, the lower end of that range falls within the limitation of 20 nm or less.

14. Regarding claim 12, Aziz et al. disclose the organic electroluminescent display apparatus according to claim 10, wherein the buffer layer contains an oxide (paragraph 0042, lines 122-123).

15. Regarding claim 13, Aziz et al. disclose the organic electroluminescent display apparatus according to claim 10, wherein the buffer layer contains aluminum oxide (paragraph 0042, lines

122-123). Aziz et al. teach that the buffer layer can be made from a metal oxide, which encompasses all metal oxides, including aluminum oxide.

16. Regarding claim 14, Aziz et al. disclose the organic electroluminescent display apparatus according to claim 10, further including: a layer (see Fig. 4, item 46; paragraph 0067) contiguous with the function layer and containing any of an alkaline metal element and an alkaline earth metal element (see Fig. 4, items 45 and 46; paragraph 0065; the electron transport region contains LiF or KCl, which are alkaline metals; the electron transport region). The layer (see Fig. 4, item 46) is an electron transport layer.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aziz et al. (U.S. 2002/0135296 A1) in view of Hosokawa et al. (U.S. 6,157,127).

19. Regarding claim 7, Aziz et al. disclose the method for manufacturing an organic electroluminescent device according to claim 6. Aziz et al. fail to disclose wherein the buffer layer contains an oxide, and the step of forming a buffer layer includes any of a step of oxidizing the second electrode and a step of depositing the oxide thereon.

Hosokawa et al. disclose the method of forming a buffer layer for an organic electroluminescent device wherein a step of oxidizing the second electrode and a step of

depositing the oxide thereon (column 12, lines 57-60). The oxidizing step allows the oxidized portion of the electrode to be used as a buffer layer, thereby reducing cost and manufacturing steps.

Therefore, it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to modify the organic electroluminescent device of Aziz et al. to include the step of forming a buffer layer includes any of a step of oxidizing the second electrode and a step of depositing the oxide thereon for the added benefit of allowing the oxidized portion of the electrode to be used as a buffer layer, thereby reducing cost and manufacturing steps.

Response to Arguments

20. The examiner acknowledges the amendment to claims 1, 6, 10 and 14.

21. Aziz specifically discloses a carrier injection layer (see Fig. 4, item 47; paragraph 0067). It's an electron injection layer; electrons and holes are both considered carriers.

22. Aziz specifically shows a layer contiguous with the function layer that contains LiF or KCl, lithium and potassium are both alkaline metals (see Fig. 4, item 46; paragraph 0067 and paragraph 65). The electron-transporting layer is shares a boundary with the function layer, which includes the hole transporting layer, item 43, the emitting layer, item 45 and the electron-injecting layer 47.

23. Based on the information given about the carrier injection and transporting layers of Aziz, the rejection of claim 7 stands.

Contact Information

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Canning whose telephone number is (571)-272-2486. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh D. Patel can be reached on (571)-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anthony Canning

27 January 2006

ASHOK PATEL
PRIMARY EXAMINER